

President's Message

John S. Spangler MD

As we approach the House of Delegates meeting in April please help by communicating with the task force committee and reading the information available to you at the medical association.

Please mark your calendar for March 29 for the program planned by the HMA Alliance. This needs your support.

The legislative process continues with close monitoring by HMA and the need for your input into this most important function of the medical society. Many important bills are presented each year which may have a direct impact on your practice. Please help in anyway you can.



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Hawaii Medical Journal

Extra copies of the *Hawaii Medical Journal* September Special issue on Domestic Violence and the December Special issue on Death and Dying are available. For more information please contact the Hawaii Medical Association at (808) 536-7702, or Fax us at (808) 528-2376.



Medical School Hotline

Modifications to the Problem-Based Learning (PBL) Curriculum Increase Opportunities for Learning Basic Sciences

By Leslie Q. Tam, Ph.D.

Director Office Medical Education

Recent trends in medical education across the country include a shift from traditional teacher-centered, lecture-based curricula to student-centered, problem-based curricula. In 1989, the John A. Burns School of Medicine switched to a problem-based learning (PBL) curriculum, and recently it was identified as one of eight medical schools leading reform of medical education in the United States. The PBL curriculum was adopted, in part, because the basic sciences, given traditionally by lecture format in the first two years, was considered excessive and fragmented. In the original PBL curriculum obtained from McMaster University, very few lectures were given. However, the curriculum has been modified each year, based on input from students and faculty. Recent modifications have increased opportunities for students to learn basic sciences in the first two years.

What is Problem-Based Learning? Problem-based learning is an approach in which students learn basic sciences in the context of solving clinical problems. Instead of meeting in large auditoriums to hear faculty give basic science lectures, students meet in small groups of five or six, each with a faculty tutor. Rather than lecture, faculty facilitate inquiry and critical-thinking. Students are urged to discuss uncertainties, think critically, ask questions, and research answers independently. Over the first two years, students investigate about 70 health care problems (HCPs) divided into five curricular units.

- Unit 1 Problems in Health and Illness
- Unit 2 Respiratory, Cardiovascular, Renal Problems
- Unit 3 GI, Endocrine, Hematologic Problems
- Unit 4 Musculoskeletal, Brain, Behavioral Problems
- Unit 5 Problems in the Ob/Gyn, Pediatric, Adolescent, Geriatric Setting

In Unit 1, for example, students investigate a problem of streptococcal pharyngitis. Students spend the first tutorial reading through the paper problem deciding what they don't know and need to research. These questions are termed learning issues. The group may ask, "What are Streptococci? What is the anatomy and histology of the pharynx? How does inflammation occur? What is the physiology of pain? How does penicillin inhibit bacterial growth? Who is at risk and can preventive measures be initiated in the community? Tutors are given problem guides beforehand and facilitate student inquiry into important areas if the group is unable to proceed. Learning issues are divided among the students, who then spend the next two days researching answers. Students use standard texts, do medline searches, and seek-out resource faculty. After two days of research, they meet together to discuss what was

Continued on Page 56

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2. Patients should minimize or avoid use of this product on areas of the skin that may be exposed to natural or artificial sunlight, including the face. If sun exposure is unavoidable, clothing should be worn to protect the skin.
3. This medication may cause stinging or burning when applied to skin with fissures, erosions, or abrasions (for example, after shaving the legs).
4. If the skin condition worsens with treatment, the medication should be promptly discontinued.

Carcinogenesis, Mutagenesis, Impairment of Fertility: Carcinogenesis: A long-term photocarcinogenicity study in hairless albino mice suggested that topically applied 12% ammonium lactate cream enhanced the rate of ultraviolet light-induced skin tumor formation. Although the biologic significance of these results to humans is not clear, patients should minimize or avoid use of this product on areas of the skin that may be exposed to natural or artificial sunlight, including the face. Long-term dermal carcinogenicity studies in animals have not been conducted to evaluate the carcinogenic potential of ammonium lactate.

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ADVERSE REACTIONS: In controlled clinical trials of patients with ichthyosis vulgaris, the most frequent adverse reactions in patients treated with Lac-Hydrin Cream were rash (including erythema and irritation) and burning/stinging. Each was reported in approximately 10-15% of patients. In addition, itching was reported in approximately 5% of patients.

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03-5982-1
Revised August 20, 1996

learned and, synthesize new information, and map learned concepts. The typical week, divided into ten half-days, is shown in Fig. 1 below.

Fig 1.—Typical Week in the PBL Curriculum

	Monday	Tuesday	Wednesday	Thursday	Friday
morning	Tutorial (3 hrs)		Wed a.m. Basic Science Conference & Laboratory	Tutorial (3 hrs)	Noon Colloquia (1.5 hrs)
afternoon		Community Medicine (3 hrs)		Clinical Skills (3 hrs)	Two Electives (4 hrs)

Problem-Based Learning vs Problem-Solving. The terms problem-based learning and problem-solving are often misunderstood. Entering students often feel incorrectly that their task is to “solve the problem” and “manage the patient.” However, the task of the student is really to use the clinical problem to learn basic and clinical science, hence the term problem-based learning. In the streptococcal pharyngitis case above, a student might ask, “What antibiotics are used to treat a strep throat?” as a learning issue. However, the tutor may coax students into asking a more rigorous question, “What is the mechanism of action of penicillin on the bacterial cell wall?” or “How does the mechanism of action of beta-lactam differ from other antibiotics?” In a traditional curriculum, such information would be given didactically; however, in the PBL curriculum, the student is challenged to formulate the question in his/her own mind and to independently seek answers in reference texts or by contacting resource faculty. The distinction between problem-based learning vs. problem-solving is important because “front-loading” of information is not required in the former; whereas, it is necessary in the latter.

Increased Basic Sciences. As shown in Fig. 1, the original PBL curriculum had students spending two of ten half-days per week in tutorial. In addition, students spent a half-day each in community medicine and clinical skills, as well as 1.5 hrs in a Friday noon colloquium. The remaining hours were unscheduled to permit independent research. Students were not required to sit in lectures or labs. Based on ongoing student and faculty feedback, however, modifications have been made to the McMaster curriculum, which have increased the opportunities for students to learn basic sciences.

Wednesday Morning Basic Science Conference/Lab. Wednesday morning conferences contain two hrs per week of lectures on basic science topics central to the week’s HCP. For example, if the students are studying a problem of reflux esophagitis, the two hours Wednesday morning may be shared by a physiologist lecturing on GI motility and a pharmacologist lecturing on the pharmacology of drugs used to control acid secretion in the stomach. These basic science lectures are followed by 1.5 hours of laboratory experiences, in such disciplines as histology, pathology, and microbiology. Although attendance at Wednesday Morning Conferences is not required, student attendance is regular, and students are examined on content in end-unit assessments.

Gross Anatomy/Clinical Skills Course. In 1994, a gross anatomy/clinical skills course (Biomed 571) was introduced in Unit 1. Health care problems in Unit 1 have been organized on an anatomical theme. Students begin with the pharynx and study a case of streptococcal pharyngitis in the first few weeks. The anatomy and clinical

skills course, therefore, focuses on an introduction to the physical exam and the throat. Students then move to a problem involving the chest, and the gross anatomy and clinical skills follows accordingly. The course was introduced in response to student concerns that course in gross anatomy was essential for every medical student. Student feedback has been very positive, and this successful course is now an integral part of the curriculum.

Two Basic Science Electives Per Week. Students may meet with up to two basic science preceptors per week. Each elective course meets for two hours per week and are enrichment opportunities which expand on Unit themes. They are not independent courses. For example, Unit 2 (12 weeks) deals with respiratory, cardiovascular, and renal HCPs. In the Unit 2 Infectious Disease elective, about 15 students examine infections that are not covered in the "core" HCPs. Students who take the elective are encouraged to share new information with other students. Electives are offered in anatomy, histology, pathology, physiology, pharmacology and biochemistry, microbiology, and immunology, among other subjects. Enrollment in electives generally average about 10-15 students, but in the second year Pathology elective given by Dr. John Hardman, virtually all students enroll. Students may design their own electives, which may touch on any subject, including public health, laboratory science and clinical skills, provided arrangements can be made with faculty.

Basic Science Foundations. Last year, faculty offered a series of "Foundation Lectures" each Friday afternoon in Unit 1. In these lectures, overviews of each basic science discipline were presented. Students were offered a lecture on humoral vs. cell-mediated immunity as part of the immunology foundation series, for example.

Student feedback has been mixed, and faculty are now considering ways to improve the foundation series. This is simply the most recent example of how faculty are responding to student feedback in ongoing attempt to improve the curriculum.

Outcomes. In recent years, JABSOM students have scored at or above the national average in the USMLE1. This would suggest that the PBL curriculum at the JABSOM, with the modifications described, is effective. Recently, 1200 tutors in 22 U.S. and Canadian medical schools were evaluated regarding overall attitudes and opinions about PBL2. Respondents rated PBL more positively than traditional methods in areas of student interest and enthusiasm, student reasoning, and preparation for clinical rotations. The two methods were judged to be equally efficient for learning, and traditional methods were judged to be superior for teaching for factual knowledge in the basic sciences. The recent modifications of the JABSOM PBL curriculum are hoped to enhance learning of the basic sciences in the first two curricular years. The curriculum continues to be modified as students and faculty search for the right balance between between lectures and independent study.

The learning of basic science is but one dimension of the PBL curriculum. Faculty will strive to produce physicians who retain the qualities of the lifelong learner, independent thinker, compassionate humanitarian, and modern scientist who can live with the ambiguities demanded in the art of healing.

References

1. Nagawa, G. 1996. Med School Hotline: USMLE performance of medical students at the John A. Burns School of Medicine. *Hawaii Medical Journal* 55,113.
2. Vernon, D.T. 1995. Attitudes and opinions of faculty tutors about problem-based learning. *Acad. Med.* 70:216-23.

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